Working Paper 2012-07

Demographic Impact of Immigration into a Low Fertility and Aging Society

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http://www.kihasa.re.kr
ISBN: 978-89-8187-876-4 93330

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Background and Purpose

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Background and Purpose

Korea's low fertility rate has prolonged without any improvement from the world's lowest level after it had plunged from an extremely high to low level within a short period of time. Rapidly falling fertility is likely to entail the world's fastest population aging in Korea. Such a trend of low fertility and population aging is forecast to result in the shortfall of labor force, worsening labor productivity, growing pressure of social security, shrinking domestic demand, diminishing capital and economic slow down.

Korea's fertility rate started to decline again since the economic crisis in 1997, which coincided with an increase in immigrants. As people with higher education attainments have increasingly avoided 3D jobs, small to medium sized companies have been struggling to find workers while youth unemployment has been exacerbated. Consequently, low-skilled workers have significantly increased. At the same time, as an increasing number of women have attained higher education and participated in economic activities, late marriage and single households have become prevalent. As a result, single men in rural areas and low-income males in urban areas have to find their mates abroad, resulting in a sharp rise in the number of female immigrants who have entered Korea in pursuit of marriage. In short, an increase in immigrants has been induced not by opening due

to globalization but by the supply and demand in the marriage and labor markets.

Likewise, late marriage, low fertility and rapid growing foreign workers and international marriage immigrants have shifted the focus of strategies to address low fertility and population aging on to the immigrants. It is based on the argument that the immigration will mitigate depopulation and population aging and that immigrants' high fertility will help raise the fertility rate. In particular, it is also expected that the shortfall of labor and the growing burden of social security can be resolved as the immigration is centered on young people.

However, the expansion of immigration is a large-scale, independent social phenomenon that cannot be solely affiliated to low fertility and population aging. It is because an increase in immigrants can create a new realm that is not relevant to low fertility and population aging although it may be caused by low fertility and population aging to some degree. When we recall the cases of advanced nations with longstanding immigration history, the immigration can increase social costs due to competitions for jobs and social conflicts in the long term even though it may bring about economic benefits in the short term. Thus, when policies to lure immigrants are considered in order to tackle low fertility and population aging or for economic issues, it is necessary to perform accurate diagnosis on the positive and negative effects of immigration.

The study is aimed at analyzing the effect of immigration on population. The study can be used as basic data to assess the size and characteristics of immigrants to Korea. In addition,

it is also expected that the study can serve as basic data for developing a comprehensive policy framework to improve the sustainability of social development by incorporating the effect of immigration with policy measures such as the recovery of fertility rate and the use of female and elderly labor force.

Chapter

02

Review of Previous Studies

Chapter 2

Review of Previous Studies

1. Impact of Immigration on Population Size

Immigration may make an impact on the size and structure and mix of population. The size of population is affected by the fertility and mortality level of immigrants while the structure of population is influenced by the age, home country, language, education, working status and income level of immigrants (Beaujot, 2002). Regarding the impact of immigrants on the size of population, Espenshade (1987) indicated that the immigration greatly affects the natural growth of population in some European countries, analyzing in 1975 that immigrants and their natural expansion substantially affected the growth of the West German population. A study conducted by George et al. (2002) pointed out that Canada without international migration and with the fertility rate below the replacement level may end up with population extinction in the long-term. Loh and George (2007), based on the data of the 2005 Canadian population projections, assessed the effect of international migration on the population until 2056 in two different scenarios with and without international migration. They divided the effect of international migration into direct impact, indirect impact, the size of aggregate net international migration, and aggregate natural growth. The direct impact, a contribution of the net international migration to the

total population, is estimated to be 14 million as of 2056. The indirect impact, a contribution of immigrant offspring, is projected to be 3 million by 2056. With respect to a contribution of the net international migration to population growth, the growth of the population without international migration is likely to decline by an average of 0.2% per year in 2006-2011 and turn into negative after 2026 while the population with international migration will see static growth even though the growth of the population will gradually slow down.

In the mean time, some argue that the immigration does not make a significant contribution to population growth. George et al. (1997) analyzed the impact of fertility, mortality and immigration on population by using the 1993 population data as a base population. Those three factors - fertility, mortality and immigration - were assumed at high, medium and low variants, respectively, generating 7 different scenarios. The projection period was from 1993 to 2041. The analysis revealed that fertility greatly affects population growth during the initial three years of the projection period. Immigration, which also acts as a contribution factor, is less influential compared to fertility in 1996-1997 and 1999-2000. The effect of immigration on the total population increases after the initial three years, but fertility still makes the biggest contribution given its aggregate effect. Long's (1991) study based on the 1986 population data also showed that the aggregate effect of fertility is the largest on population growth even though immigration is also influential, emphasizing the impact of fertility rather than immigration. Mitra (1992) used the population projections of Canada (1986-2186)

to assess the effect of immigration on the population mix when the fertility rate is below the replacement level. It was assumed that the fertility rate stays at 1.7 and that the mortality rate continues to decline until 2011 and the life expectancy at birth is fixed at 76.8 for men and 83.4 for women after 2011. It was also presumed that the crude emigration rate is 0.025, that the number of immigrants is 150,000 a year and that their age structure is constant every year. The projection results unveiled that the population gradually grows for the initial 40 years despite the fertility rate below the replacement level remains unchanged and that immigrants make only a partial contribution. Such a result was also observed when estimating the number of immigrants needed to maintain the largest scale of population. The number of immigrants needed for the initial 40 years is invariably 150,000. Some fluctuations were detected after the initial 40 year period. However, the number of immigrants needed decreases after the peak of 241,000 in 2046. In sum, selective immigration may bring about some benefits to population in the short-term but end up as an ineffective strategy with the growing burden of elderly care. The pattern of immigration prevents depopulation or is effective only in the case of population extinction with the fertility rate below the population replacement level. The age structure of population is solely determined by mortality and is not effectively altered by immigration policies. Some advance research (Feld, 2000; UN, 2000) reported that a great number of immigrants are required to maintain specific population structures. In other words, an appropriate degree of migration can affect the age structure of host nations to a limited

extent, and fertility is a more influential factor in the long-term.

2. Impact of Immigration on Population Structure

Immigration can affect the age structure of population, which can be measured by comparing the medium age of immigrants and natives. A Canadian case shows that the medium age of immigrants was 25 on average in 1956-1976, 27 in 1981-1986, 28 in 1986-1990 and 30 in 1994-1999, which is relatively more stable compared to natives (Beaujot et al., 1989; Beaujot and Hou, 1993; Belanger, 2001:53). In comparison, the medium age of the total Canadian population substantially rose to an average of 37.6 in 2001 from 26.3 in 1961. The medium age of immigrants was lower than that of natives by 1-2 in 1961 and 7-8 in 2000. Immigrants form a relatively younger population on average due to new comers even though it is widely known that both immigrants and natives age. However, its influence is limited when the share of immigrants in the total population is small. Therefore, demographic phenomena such as baby boomers approaching the elderly group have a bigger impact on the population structure than immigrants. Denton et al. (2001) measured the average age of population by taking account of fertility, mortality and international migration. The population projection which only assumed fertility and mortality showed that the average age of the total population is 0.5 year higher than the actual average age in 1981. The medium age in 2001 which was projected by assuming that there was no international migration in

1951-2001 is 0.8 year higher than the actual age. The Canadian Statistics Office's projection (1990) based on the 1986 Census revealed that a zero-immigration scenario and a high-immigration scenario showed only a 2 year difference in the medium age in 2036. In other words, the average age declines only by 2 years when receiving 200,000 immigrants a year for 50 years. Denton et al. (2001) analyzed the effect of immigrants until 2051 with three different scenarios. The first case is that the number of immigrants is 225,000 (base assumption), the second case is that immigrants grow by 50% and the third case is that immigrants double the base assumption. The medium age in 2051 was 46.5, 45.1 and 44.2, respectively. In other words, with the addition of 225,000 immigrants a year for 50 years, the medium age falls by 2.3, and the share of the population aged 65 or more declines a mere 3%p (from 25.9% to 22.9%). George, Nault and Romaniuc (1991) made a similar conclusion that the effect of immigrants is distributed across all age brackets. In short, the effect of immigration on the age structure is minimal.

Foreigners coming to a host nation tend to be younger than the host population. So, it is widely believed that immigration can offset population aging. However, the analysis of migration flows into advanced nations proved that it is groundless (UN, 2000; requoted from Loh and George, 2007). Le Bras (1991) assessed the demographic results of migration flows in Australia, Belgium, Canada, France, Germany, Italy and Sweden after the World War II and concluded that the effect of "youngness" of migration on a host country is negligible. The average age of immigrants was 0.4-1.4 years lower than that of natives.

Lesthaeghe et al. (1988) made projections for the age structure of 12 European countries until 2060 when there is immigration and when there is not. They concluded that the trend of population aging in those countries may be weakened but cannot be prevented by immigration. Loh and George (2001) performed population projections based on the 1996 Census. The study unveiled that the population aged 65 or more represents 25.4% in 2051 with the addition of 225,000 immigrants a year and 29.8% without international migration. The analysis of the effect of international migration on population aging based on the 2005 population projection showed that the number of people aged 65 or more per 100 persons aged 15 or less rises to 200.5 in 2056 from 160.5 in 2031 when there is international migration. Without international migration, the number of people aged 65 or more per 100 persons aged 15 or less climbs to 266.3 in 2056 from 198.6 in 2031. In other words, without international migration, the number of people aged 65 or more per 100 people aged 15 or less increases by 38 in 2031 and 66 in 2056. However, the result also implies that international migration may mitigate population aging but cannot serve as a precautionary measure.

3. Impact of Immigration on Fertility

Five hypotheses, including disruption, the interrelation of events, socialization, adaptation and selection, will be reviewed to set forth explanations on the fertility behavior of immigrants prior to studying the effect of fertility behavior of immigrants

on host countries. These hypotheses are distinguished by time effect, the social and demographic attributes of immigrants and their antecedents, living environment and cultural factors. The fertility of immigrants are analyzed in the disruption and the interrelation of events hypotheses on a step-by-step basis.

The disruption hypothesis assumes that the migration process discourages fertility. Disruption factors include seasonal factors (Massey and Mullan, 1984), separation from a spouse (Goldstein, Goldstein, and Piampiti, 1973; Visaria, 1969) and stress due to migration to new places (Hervitz, 1985), which undermine fertility (Stephen and Bean, 1992). Disruption factors temporarily affect the fertility behavior so that fertility recovers to the previous level. However, some still argue that fertility may diminish due to its aggregate effect even though such an effect may take place in a temporary manner (Stephen and Bean, 1992). The hypothesis of the interrelation of events focuses on the interaction between immigrants and family integration / marriage. This hypothesis, unlike the disruption hypothesis, assumes that fertility increases right after migration due to family formation (Mulder and Wagner, 1993; Singley and Landale, 1998). However, it mostly applies to the birth of the eldest child and becomes irrelevant with higher birth order.

The adaptation hypothesis analyzes the fertility behavior of immigrants in the medium-term. This hypothesis is based on a premise that individuals can be re-socialized, assuming that the fertility behavior of immigrants becomes similar to that of host countries. In other words, the fertility behavior of immigrants changes depending on the period of residency in host countries,

and cultural factors and socioeconomic conditions facilitate such changes in the fertility behavior.

The socialization hypothesis emphasizes the re-socialization of immigrants with focus on values, norms and behaviors which prevailed in the childhood of immigrants. This hypothesis insists that immigrants conform to the fertility behavior of home countries even though their behavior differs from that of host countries (Milewski, 2010). The fertility of succeeding generation immigrants can be analyzed to study the fertility of immigrants from the long-term perspective. Succeeding generations are affected not only by their parent generations but also by the behaviors, values and norms of host countries. Unlike their parents, they are more likely to assimilate to the fertility of host countries, which is also known as the assimilation hypothesis.

Changing behaviors do not matter in the selection hypothesis. Instead, the hypothesis focuses on the fact that the fertility preference of immigrants is more similar to that of host countries than home countries. Similarities or differences in the fertility behavior between immigrants and natives stem from immigrants' decisions on the fertility intention. Differences in the fertility behavior between immigrants and natives are due to formational differences and may recede as immigrants tend to conform to the social and demographic traits of natives. This hypothesis indicates that the first-generation immigrants share the fertility intention of natives and that their fertility behavior becomes similar to that of natives. Selection is determined by non-observable factors such as aspiration for social movement or family proneness and observable factors such as education migration (Macisco

et al., 1969; Macisco et al., 1970; Zarate and Unger de Zarate, 1975; Hiday, 1978; Sabagh and Yim, 1980; Bach, 1981; Massey, 1981; Kahn, 1988; Schoorl, 1990; Wagner, 1990; Goldstein, White, and Goldstein, 1997; Hwang and Saenz, 1997; Frank and Heuveline, 2005; Kulu, 2005: requoted from Milewski, 2010).

The advance studies on the fertility behavior of immigrants present a variety of results. Studies that compared the fertility level between immigrants and natives based on the Canadian Census data found that the fertility level of immigrants is lower than that of natives. The analysis of the 1961, 1971 and 1981 Census data based on cumulative fertility revealed that the average number of children is smaller in the case of immigrants than natives (Henripin, 1972; Ram and George, 1990). The 1991 Census data showed that immigrants had more children than natives. But, given differences in the age structure, the fertility of immigrants is still lower than that of natives (Basavarajappa, 1993; Basavarajappa et al., 1993; Ram and George, 1993; Maxim, 1996: Ng and Nault, 1997. Requoted from pp.560).

Meanwhile, some studies found that the fertility of immigrants is temporarily higher right after they migrate to host countries. Ford (1990) studied the fertility behavior of immigrants in the United States. His analysis revealed that the fertility of immigrants increased right after migration into host countries as marriage or childbirth, which had been delayed due to migration, took place after migration. He indicated that the fertility of immigrants declined as it became similar to that of host countries over time. Ram and George (1990) who examined Canadian cases analyzed the fertility of immigrants by using the own-children method.

Their analysis found that the fertility of immigrants who have already migrated is always lower than the time right after migration.

The fertility of immigrants varies by generation. Rosenwaike (1973) analyzed the fertility of Italian immigrants to the United States by generation. The analysis revealed that the first-generation immigrants tend to maintain their fertility behavior while the second-generation is inclined to assimilate to that of Americans. Milewski's study (2010) sets forth a similar result. She analyzed the fertility behavior of immigrants in West Germany by generation by using the GSOEP data. The fertility rate of the first-generation immigrants varies by home country, but the fertility behavior of succeeding generations was found to be similar to that of West Germany. Some studies worked on the effect of fertility of immigrants on the host population. George, Loh and Verma (1997) insisted that the growth of the French population since 1975 has been attributed to the high fertility of North African immigrants. Li and Wu (2001) indicated that, if foreigners' fertility rate is 34% higher than the Canadian population, immigration is effective in mitigating the pace of population aging.

4. Impact of Immigration on Population Distribution

Immigration may affect the spacial distribution of host population. In particular, if immigration acts as a key driver for changes in population, the regional imbalance of population expansion can be further exacerbated. Immigration influences

population growth at the big city or province level instead of the country level. Particularly, the development of telecommunication technology and growing job opportunities in big cities solidifies the concentration of immigrants in big cities (Massey et al, 1994). A Canadian case shows that the share of immigrants was higher than that of the Canadian population in Ontario and British Columbia for 40 years from 1956 to 1996 (Denton et al., 1997:42). Gilbert and others (2001), who studied population growth in big cities from 1976 to 1996, pointed out that the growth of big cities has been mostly driven by immigrants while the growth of regions outside big cities has been led by internal migration.

Immigrants affect internal migration. It is known that the characteristics of immigrants would be diminished over time (Beaujot, 1999). For instance, the fertility, mortality and economic attributes of immigrants assimilate to natives. However, immigrants can reinforce the imbalanced distribution of population as they are more likely than natives to migrate to large regions from the initial points of arrival through additional migrations.

Chapter

03

Data and Method

Chapter 3

Data and Method

1. Data

Migration refers to all sorts of movement among countries or within a country. In other words, any movement of human beings, regardless of duration, formation or reasons, can be named as migration. International migration can be divided into emigration and immigration. Emigration is an attempt to leave one country to settle down in another country. In the case of immigration, a non-citizen enters other country to settle down. Immigrants, generally, include refugees, displaced people, uprooted people and economic immigrants (IOM, 2004).

Immigration can be divided into short-term and long-term depending on the length of stay. According to the UN's definition, a person who changes one's habitual residence to other country for more than one year is a long-term immigrant whereas a person for more than three months and less than a year is a short-term immigrant. In the case of Korea, the Immigration Control Act stipulates that a stay less than 90 days is short-term whereas a stay exceeding 90 days is long-ter m[1]. In the mean time, the Ministry of Public Administration

1) A foreigner must apply for the foreigner registration if he or she intends to stay in Korea over 90 days.

and Security includes a long-term resident who has stayed over 90 days as a foreigner without Korean citizenship (a registered foreigner under the Immigration Control Act) and a foreigner with Korean citizenship (including marriage-based naturalization and children of international marriage families) in the definition of the foreign resident.

As of 1st of January 2010, the total number of immigrants regardless of the length of stay and citizenship is 1,386,873. The number of long-term immigrants who have stayed in Korea for more than 90 days is 1,139,283, whereas the number of short-term immigrants(residents) with less than 90 days is 247,590.

Short-term stay immigrants may have a negligible impact as their stay is below three months. Thus, the study will concentrate on long-term stayers and permanent residents as subjects for analysis, which include international marriage immigrants, foreign workers and overseas compatriots regardless of the acquisition of Korean citizenship. People who currently have or had foreign citizenship in the past and their offsprings are also subject to analysis.

〈Table 1〉 Classifications of Immigrants Staying in Korea

Length of Stay	Classification	Total
Long-term	without citizenship	920,887
	Foreign workers	558,538
	Marriage immigrants	125,087
	Foreign students	80,646
	Others	106,365
	Overseas compatriots	50,251
	with citizenship	96,461
	Marriage naturalization	56,584
	Persons with citizenships acquired for other reasons	39,877
	Children of foreign residents	121,935
	Foreign parents	6,971
	Foreign-Korean parents	98,531
	Korean parents	16,433
Short-term		247,590
Total		1,386,873

Source: Ministry of Public Administration and Security (2010). 「2010 Statistics of Foreign Residents」 as of Jan. 1, 2010

2. Method

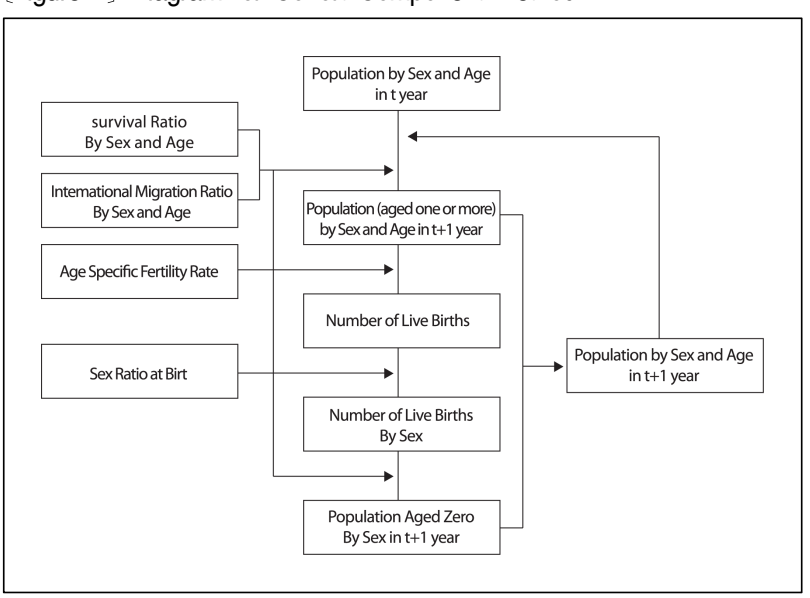
The socioeconomic effect of immigration takes place in the mid- to long-term. Thus, the long-term perspective is required for the immigration. To this end, the cohort component method will be used to perform population projections. The cohort component method adopts international migration along with fertility and mortality as demographic variables. So, it is well suited to the purpose of this study in that immigrants can be projected by sex and age. The method uses the basic population balancing equation as follows (Shryock and Siegel, 1976).

$$P(t+n) = P(t) + B - D + I - E$$

(P: population, B: number of live births, D: number of deaths, I: immigrants, E: emigrants)

The method adds the base year's (t) population by each age ('a' years old) and fertility less mortality plus net migration population (arrivals - departures) to project the next year's (t+1) population by each age ('a+1' years old). In the mean time, the population of 0 year old in the t+1 year is calculated by multiplying the fertility rate of the given age by the female population aged between 15 and 49 of the t year and summing the outcomes by each age. The cohort component method repeats this calculation to deliver projections for the future population.

〔Figure 1〕 Diagram for Cohort Component Method

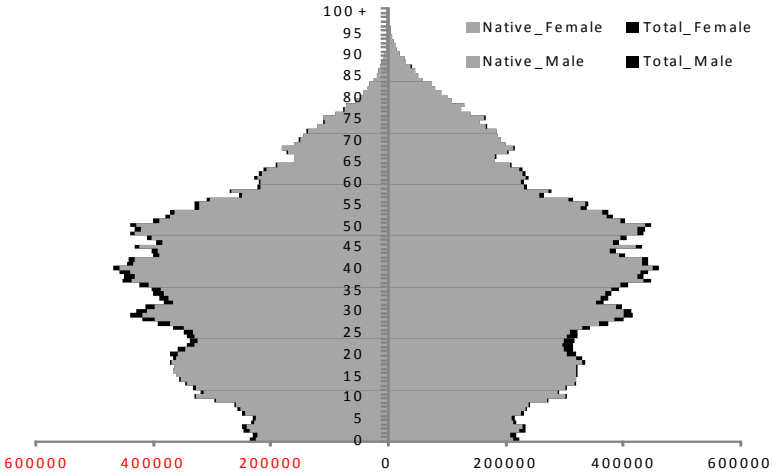


The base population and demographic variables - that is, changes in fertility, mortality and international migration - are assumed to apply the cohort component method. In general, the longer the projection period is, the less accurate projection results would be (Shryock and Siegel, 1976). However, in order to assess the socioeconomic influence of immigrants, it is necessary to assume a lengthy projection period. Thus, the projection period of this study is set out to be from 2010 to 2100.

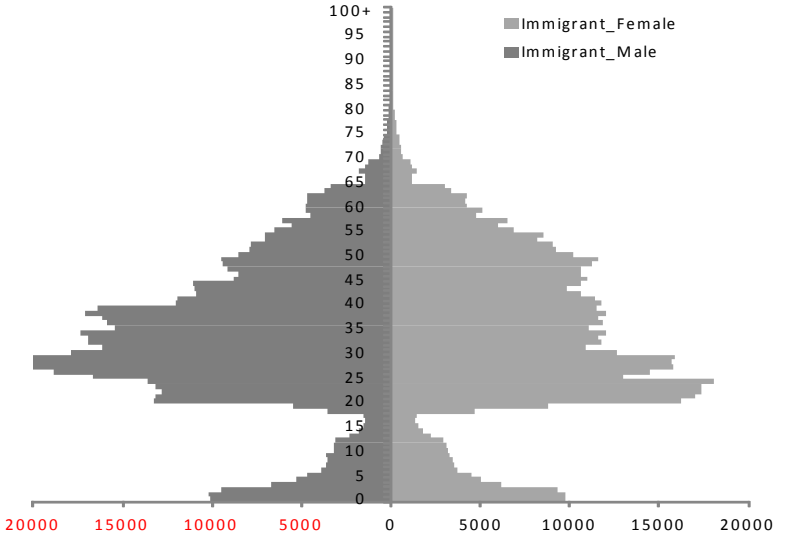
Base Population

The base population as a population of the initial year in the projections is the mid-year estimated population as of July 1, 2010, which is 49,719,207. This study divides natives as one group and immigrants as another to make projections for the whole population. It is because marriages between natives and immigrants give birth to offspring. The number of natives is 48,517,063. As noted, immigrants in this study are defined as residents for more than 90 days, including foreigners with and without citizenship. The number of immigrants based on such criteria is 1,139,000 as of January 1, 2010. The population by sex and age for the whole and natives immigrants is illustrated in Figure 2. The population by sex and age for the immigrants is illustrated in Figure 3.

[Figure 2] The Whole Population and Natives by sex and Age (as of January 1, 2010)



[Figure 3] Immigrants by Sex and Age (as of January 1, 2010)



Fertility Assumptions

The fertility of immigrants can differ from that of natives as it is affected by ethnic characteristics, the social and cultural background of departing countries, and the length of stay in departing countries and Korea. According to Lee, et al(2009), although the fertility rates of immigrants differ from one country to another country of origins, the total fertility rate of immigrants as a whole is similar to that of the natives after standardizing the age and marital status. Therefore, this study assumes that the fertility rate is the same for both natives and immigrants.

This study sets up medium and high variants for fertility fluctuations. The medium variant assumes the total fertility rate will rise from 1.23 in 2010 to 1.28 in 2030, which will be sustained onward(KNSO, 2006). The high variant assumes that the total fertility rate will rise up to 1.7 in 2020 as a target set by the government's Second Basic Plan for Low Fertility and Aging Society and will increase to the population replacement level in 2040 which will be sustained onward. The current fertility level is substantively low so that this study does not make a low variant that the fertility rate will fall even further.

〈Table 2〉 Assumptions for Change of Total Fertility Rate

(Unit: Number of live births per woman)

medium Variant		High Variant	
2010	1.23	2010	1.23
2015	1.24	2015	1.46
2020	1.25	2020	1.70
2025	1.27	2025	1.80
2030	1.28	2030	1.90
2035	1.28	2035	2.10
2040~	1.28	2040~	2.10

Mortality Assumptions

The mortality of immigrants is also different from that of natives. It is because immigrants have different morbidity and mortality from natives due to the social and cultural background of home countries, ethnic characteristics, nutritional status before arrival, and exposure to health care and sanitation. However, as there have been not sufficient studies to measure immigrants' mortality, this study assumes that the mortality of immigrants is the same as that of natives.

The fluctuations of mortality are assumed by reflecting the actual probability of dying measured by the National Statistics Office(KNSO, 2006). The fluctuations of mortality are assumed by life expectancy at birth, but the probability of dying by sex and age, equivalent to the assumed life expectancy at birth, will be applied in the projections. It is assumed that life expectancy at birth for males increases 76.15 in 2010 to 82.87 in 2050 and that for females increases from 82.88 to 88.89.

〈Table 3〉 Assumptions for Change of Life Expectancy at Birth

(Unit: years)

	Male	Female
2010	76.15	82.88
2015	77.11	83.80
2020	78.04	84.68
2025	78.93	85.50
2030	79.79	86.27
2035	80.60	86.99
2040	81.39	87.67
2045	82.15	88.31
After 2050	82.87	88.92

Source: Lee Samsik (2011), 「Future Strategies for the Age of 100: Prospects for and Challenge of Population and Social Insurance Finance」. Korea Institute for Health and Social Affairs

International Migration Assumptions

Until recently, population projections in Korea has focused only on the fluctuation of fertility, not on international migration. It was deemed that international migration would have a minimal impact on the population as its size is small. However, with growing international migration, assumptions for the fluctuations of international migration as well as fertility and mortality have become more important for population projections.

In reality, predicting the fluctuation of international migration is more difficult compared to fertility or mortality. The fluctuation of international migration is volatile as it is affected by short-term factors or environments such as the political and economic situation and policies (laws and regulations, administrative procedures, etc.) of origin and destination countries. In the case of Korea, for the past decade, a wide spectrum of immigrants, including international marriage immigrants, high- and low-skilled workers and foreign students, have sharply increased. Such a trend is likely to be sustained in the future as well. Thus, it is no longer valid to assume that the current international migration rate will remain unchanged in the Korean population projections. Northern or Western European countries with the long history of immigration have been recently inclined to suppress immigration given the negative impact of immigration, resulting in the relatively low positive net international migration rates. Meanwhile, Eastern or Southern European nations with the short history of immigration show the relatively high positive net international migration rates. In the case of Korea, with protracted

ultra low fertility rate and rapid population aging, it can be assumed as a high variant that the positive net international migration rates is likely to rise. In contrast, it can also be assumed as a low variant that the positive net international migration rates can decline or be converted into negative net international migration rates as the supply and demand of international marriage steeply fall (Lee Samsik et al., 2007) or policies in consideration of the adverse effects of immigrants are put in place.

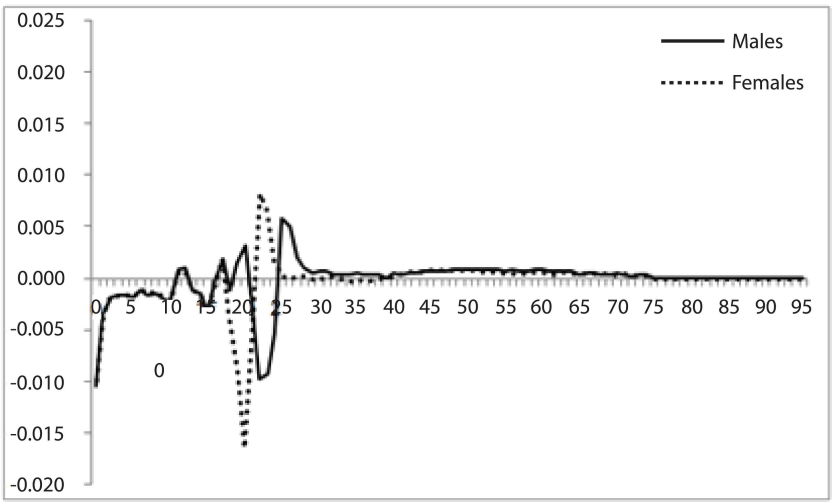
This study has set up a medium variant by estimating the average net international migration rates by sex and age of natives and immigrants from 2008 to 2010 based on the data of the Ministry of Justice.[2] OECD countries are, on a basis of an average net international migration rates in 2004-2008, divided into one group of countries with higher net international migration rates and another group of countries with lower net international migration rates than Korea to calculate the average net international migration rates for each group. Then, the multiplier for each is calculated by dividing the average net international migration rates of each group by the average net international migration rates of Korea, an average from 2008 to 2010 . As a result, the former is approximately 1.5 multiplier, and the latter is approximately 0.5 multiplier. In other words, this study has set

2) The reason why the average net international migration rates is calculated only for the period of 2008-2010 is that foreign workers representing the largest share return to their home countries as the due date comes based on the 3 year cycle which was set by the employment permit system introduced in 2004. For instance, the maturity year of the employment permit system is 2007 and 2010. Thus, it would be appropriate to consider another cycle from 2008 to 2010 which will be initiated after the maturity comes in 2007.

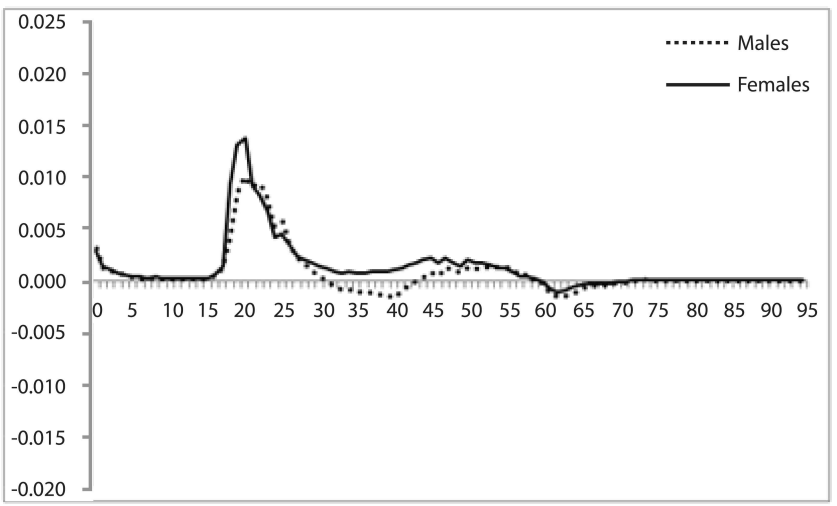
up a high variant where the net international migration rates will be 1.5 times higher than the average net international migration rates in 2008-2010 and a low variant where the net international migration rates will be 0.5 times lower.

Thus, this study sets forth four assumptions for international migration. Assumption 1 assumes that the current net international migration rates of natives by sex and age will remain unchanged in the future but there have been and will be no immigrants; this assumption is developed to make comparisons with other international migration assumptions. Assumption 2 assumes as a medium variant that the current net international migration rates of natives and foreigners by sex and age will be sustained in the future. Assumption 3 assumes as a high variant that the current net international migration rates of natives by sex and age will be maintained and those for foreigners will increase by 1.5 times. Assumption 4 assumes as a low variant that the current net international migration rates of natives by sex and age will remain unchanged and those for foreigners will decline by 0.5 times in the future

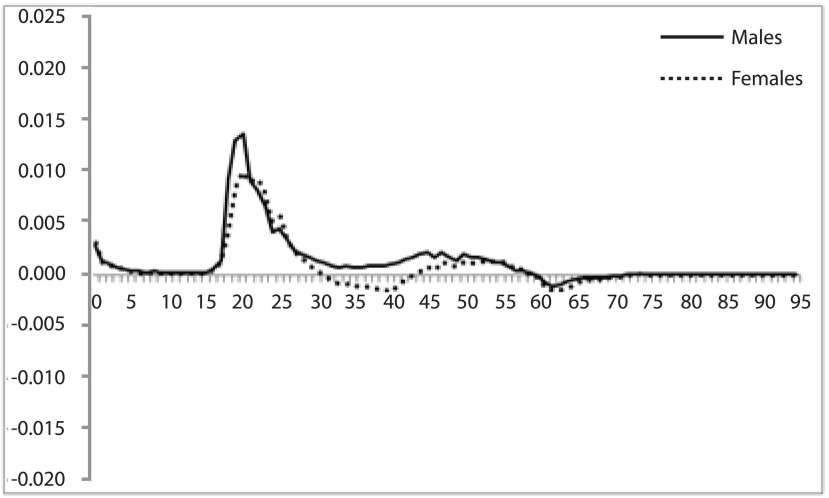
〔Figure 4〕 Net International Migration Rates of Natives (Average in 2008-2010)



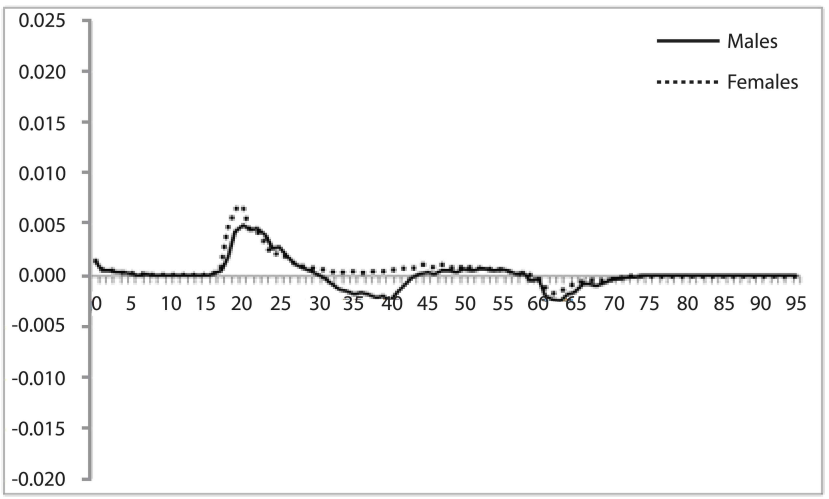
〔Figure 5〕 Medium Variant for Net International Migration Rates of Foreigners (Average in 2008-2010)



〔Figure 6〕 High Variant for Net International Migration Rates of Foreigners (Average in 2008-2010)



〔Figure 7〕 Low Variant for Net International Migration Rates of Foreigners (Average in 2008-2010)



Scenarios for Population Projection

The population projections set up five scenarios by combinations of fertility and international migration assumptions, keeping the mortality and sex ratio at birth assumptions the same for all scenarios. The scenario S10 assumes the medium variant of fertility and no international migration for foreigners. The scenario S20 assumes the high variant of fertility and no international migration for foreigners. The scenario S11 assumes the medium variant of fertility and the low variant of international migration for foreigners. The scenario S21 assumes the medium variant of fertility and the medium variant of international migration for foreigners. The scenario S11 assumes the medium variant of fertility and the high variant of international migration for foreigners.

〈Table 4〉 Scenarios for Population Projections

Scenario	Assumption for International Migration (net international migration rates)	Assumption for Fertility (TFR)	Assumption for Mortality (life expectancy at birth)
S10	average(2008-10) for natives & zero for foreigners	(Medium variant) 1.23 in 2010 → 1.28 in 2030 and onward	76.2 in 2010 → 82.9 in 2050 & onward for males 82.9 in 2010 → 88.9 in 2050 & onward for females
S11	(Low variant) average(2008-10) for natives & 0.5 times of average(2010-10) for foreigners	Same as above	Same as above

Scenario	Assumption for International Migration (net international migration rates)	Assumption for Fertility (TFR)	Assumption for Mortality (life expectancy at birth)
S12	(Medium variant) average(2008-10) for natives & average(2008-10) for foreigners	Same as above	Same as above
S13	(High variant) average(2008-10) for natives & 1.5 times of average(2008-10) for foreigners	Same as above	Same as above
S20	Same as above	(High variant) 1.23 in 2010 → 2.10 in 2040 and onward	Same as above

Note: 1) assumptions for international migration will be maintained for the whole period of projection.

Chapter

04

Demographic Effect of Immigration

Chapter 4

Demographic Effect of Immigration

1. Effect of Immigration on Population Size

Effect on Total Population

If there is no international migration and the fertility of natives will be sustained at the current level (S10), the total population referring to only natives is expected to increase from 48,520,000 in 2010 to reach a peak of 49,760,000 in 2024 and then fall to 44,030,000 in 2050 and 19,990,000 in 2100. In the mean time, if there is no international migration and fertility rises to and is maintained at the population replacement level in 2040 and onward (S20), the total population will increase to 51,790,000 in 2033 from 48,520,000 in 2010. Then, the population will start to fall after 2033, but it will be relatively smaller than the medium variant for fertility so that the population will record 49,890,000 in 2050 and 40,300,000 in 2100.

〈Table 5〉 Prospects for Total Population and Immigrants

(Unit: thousands, %)

	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Total (A)										
S10	48,517	49,678	49,511	47,597	44,030	39,038	33,437	28,184	23,666	19,987
S20	48,517	50,321	51,670	51,399	49,887	47,575	44,695	42,274	40,947	40,304
S11	49,719	51,310	51,476	49,906	46,623	41,837	36,383	31,214	26,755	23,118
S12	49,719	51,792	52,458	51,351	48,514	44,127	38,990	34,047	29,720	26,177

	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
S13	49,719	52,280	53,456	52,831	50,466	46,507	41,717	37,030	32,859	29,432
Immigrants(B)										
S11	1,202	1,632	1,966	2,309	2,594	2,799	2,946	3,030	3,089	3,131
S12	1,202	2,114	2,947	3,754	4,484	5,089	5,553	5,863	6,054	6,190
S13	1,202	2,602	3,945	5,234	6,436	7,469	8,280	8,845	9,193	9,445
B/A×100										
S11	2.4	3.2	3.8	4.6	5.6	6.7	8.1	9.7	11.5	13.5
S12	2.4	4.1	5.6	7.3	9.2	11.5	14.2	17.2	20.4	23.6
S13	2.4	5.0	7.4	9.9	12.8	16.1	19.8	23.9	28.0	32.1

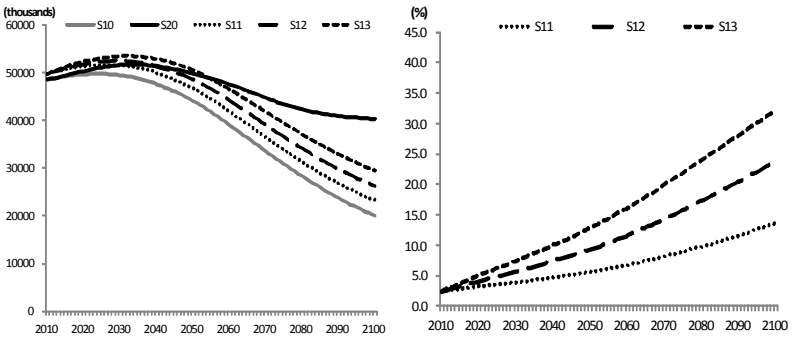
In the case of the medium variant for international migration with the medium variant for fertility (S12), the total population will hit a peak of 52,460,000 in 2029 from 49,720,000 in 2010 and then will start to decline to 52,460,000 in 2030 and 48,510,000 in 2050. The size of immigrants is projected to increase from 1,200,000 in 2010 to 4,480,000 in 2050. The share of immigrants in the total population is expected to rise from 2.4% in 2010 to 9.2% in 2050.

In the case of the high variant for international migration with the medium variant for fertility (S13), the total population is likely to rise from 49,720,000 in 2010 to 53,490,000 in 2032 and then fall to 50,470,000 in 2050. The number of immigrants is expected to increase to 6,440,000 in 2050, taking up 12.8% of the total population.

Under the low variant for international migration with the medium variant for fertility (S11), the total population is projected to increase from 49,720,000 in 2010 to hit a peak of 51,570,000 in 2027 and then decline to 46,620,000 in 2050. The share of immigrants is expected to rise to 5.6% in 2050.

Taking those projection results into consideration, it can be noted that immigration makes a contribution to the total population, ranging from 6 to 13% depending on the variant for international migration (5.6% for low variant, 9.2% for medium variant, 12.8% for high variant) in 2050. The result of the low variant as of 2050 is lower than Italy of 7.4% in 2010 while the result of the medium variant is close to Belgium of 9.1% and Portugal of 8.6% in 2010. The result of the high variant as of 2050 is higher than France of 10.7% and the U.K. of 10.4% and close to Germany of 13.1% in 2010. Meanwhile, if the fertility rate of natives rises to the replacement level in 2040 even without immigrants (S20), the decline of the total population will be the most modest. The difference in the total population between the high variant scenario for the fertility of natives (S20) and the variants for international migration can be as big as 3,300,000 (the low variant for international migration). It is because the significant portion of immigrant into Korea is foreign workers who return to their home countries after a given period of time and immigrants who settle down in Korea do not show high fertility.

[Figure 8] Prospects for Total Population and Proportion of Immigrants



Effect on the Youth Population

In the case of the medium variant for fertility without international migration (S10), the youth population (aged 0-14) referring to the natives only is projected to decline from 7,890,000 in 2010 to and 3,840,000 in 2050. Under the high variant for fertility without international migration (S20), the youth population is likely to show a moderate decline to 6,790,000 in 2050.

With immigrants, the size of the youth population including the native and foreign youth population will vary depending on the degree of immigration. In the case of the medium variant for international migration under the medium variant for fertility (S12), the youth population is likely to decrease from 8,030,000 in 2010 to 4,620,000 in 2050. The immigrant youth population takes up a mere 2% of the total youth population in 2010. But, the share is expected to sharply rise to 9.4% in 2030 and 16.8% in 2050.

In the case of the high variant for international migration under the medium variant for fertility (S13), the total youth population

is forecast to fall from 8,030,000 in 2010 to 4,940,000 in 2050. The share of the immigrant youth population will rise from 1.8% in 2010 to 12.5% in 2030 and 22.2% in 2050.

Under the low variant for international migration with the medium variant for fertility (S11), the youth population is likely to decrease from 8,030,000 in 2010 to 4,300,000 in 2050. The portion of the immigrant youth population is forecast to rise from 1.8% in 2010 to 6.0% in 2030 and 10.7% in 2050.

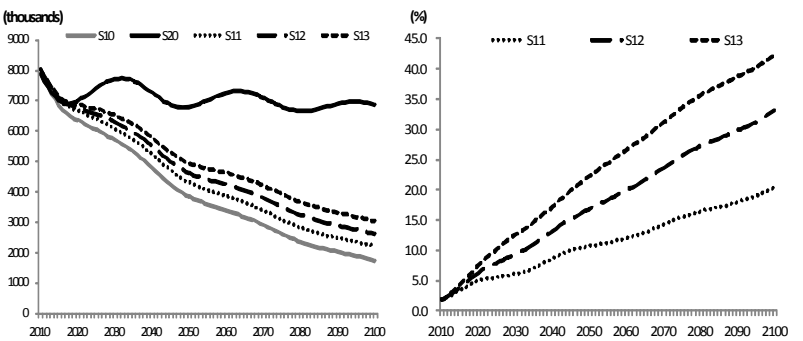
It is deemed that the share of the immigrant youth population is likely to rapidly rise in the mid- to long-term under the scenarios based on assumptions for international migration. It is because the native fertile population and the number of newborns gradually decline while the number of children of immigrants with the high share of the fertile population continues to grow. The difference in the size of the youth population among the assumptions for international migration is expected to be 320,000 between the high and medium variants and 320,000 between the medium and low variants in 2050. In the mean time, if the natives' fertility rises, the size of the youth population is likely to be larger than any other assumptions for international migration. If the current level of fertility continues without immigrants (S10), the native youth population is expected to hover around 4,000,000 in 2050, but if fertility continues to rise even without immigrants (S20), it will be 6,800,000. In addition, the youth population under the high variant for fertility is likely to be larger than that of assumptions for international migration by 1,900,000 (low variant) - 2,500,000 (high variant) as of 2050.

〈Table 6〉 Prospects for the Youth Population (0-14), 2010-2100

(Unit: thousands, %)

	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Total (A)										
S10	7,886	6,356	5,697	4,776	3,840	3,395	2,894	2,354	2,032	1,746
S20	7,886	6,998	7,711	7,248	6,788	7,264	7,092	6,665	6,906	6,878
S11	8,033	6,681	6,063	5,224	4,299	3,854	3,372	2,816	2,475	2,192
S12	8,033	6,774	6,286	5,494	4,616	4,236	3,783	3,233	2,891	2,608
S13	8,033	6,866	6,510	5,766	4,936	4,619	4,197	3,652	3,310	3,027
Immigrants(B)										
S11	147	326	366	448	458	460	478	462	442	446
S12	147	418	589	718	776	841	889	879	859	862
S13	147	511	812	990	1,096	1,225	1,303	1,299	1,278	1,280
B/A×100										
S11	1.8	4.9	6.0	8.6	10.7	11.9	14.2	16.4	17.9	20.3
S12	1.8	6.2	9.4	13.1	16.8	19.9	23.5	27.2	29.7	33.0
S13	1.8	7.4	12.5	17.2	22.2	26.5	31.1	35.6	38.6	42.3

[Figure 9] Prospects for Youth Population and Proportion of Immigrants



Effect on the Working Age Population

As the working age population (aged 15-64) will show a fluctuation after 15 years even with higher fertility, the difference between scenarios may not be substantial until 2050. The working age population is expected to rise from 35,270,000 in 2010 to hit a peak of 36,030,000 in 2016 and is likely to decline to 31,740,000 in 2030. In 2050, the working age population is forecast to be 23,240,000 in the case of the medium variant for fertility without immigration (S10), while it is likely to fall by 20% from the current level to 26,150,000 under the high variant for fertility (S20).

In the case of the medium variant for international migration with the medium variant for fertility (S12), the working age population including natives and immigrants is expected to grow from 36,300,000 in 2010 to reach a peak of 37,420,000 in 2016. Then, it will decrease to 26,190,000 in 2050. The contribution of the immigrant working age population to the total is expected to be 2.8% in 2010, 6.2% in 2030 and 11.3% in 2050.

Under the high variant for international migration with the medium variant for fertility (S13), the total working age population is expected to hit a peak of 37,680,000 in 2018 and then decline to 27,540,000 in 2050. The share of the immigrant working age population in the total is likely to show a steep increase from 2.8% in 2010 to 8.1% in 2030 and 15.6% in 2050.

The total working age population is forecast to fall to 24,900,000 in 2050 after reaching a peak of 37,190,000 in 2016 in the case of the low variant for international migration with the medium

variant for fertility (S11). The proportion of the immigrant working age population to the total is likely to slightly increase to 4.3% in 2030 and 6.6% in 2050.

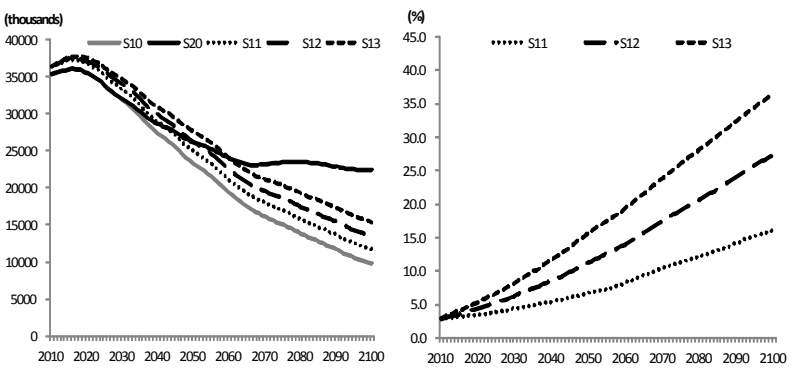
The differences in the size of working age population among scenarios are relatively larger than the youth population. It is because the majority of immigrants fall into the working age brackets. The differences in the size of the working age population among scenarios are projected to be 1,350,000 between the high and medium variants and 1,290,000 between the medium and low variants for immigration as of 2050. In the mean time, unlike the case of the youth population, the effect of rising native fertility is not likely to be larger than international migration until 2050. In the case of the scenario S20, the total working age population in 2050 is 26,150,000 which is similar to 26,190,000 under the medium variant for immigration (S12) and which is smaller than 27,540,000 under the high variant for immigration (S13). However, the effect of rising fertility is likely to grow larger than the effect of immigration over time. In other words, in the case of the high variant for fertility, the total working age population is forecast to be larger than the high variant for immigration by 2,000,000 in 2070 and 7,000,000 in 2100.

〈Table 7〉 Prospects for the Total Working Age Population (15-64)

(Unit: thousands, %)

	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Total (A)										
S10	35,267	35,426	31,742	27,273	23,242	19,318	16,113	13,854	11,672	9,732
S20	35,267	35,426	31,888	28,604	26,151	23,987	23,173	23,495	22,847	22,395
S11	36,300	36,670	33,171	28,812	24,897	21,043	17,974	15,761	13,589	11,587
S12	36,300	37,043	33,853	29,809	26,190	22,462	19,521	17,470	15,360	13,381
S13	36,300	37,422	34,550	30,837	27,538	23,951	21,157	19,287	17,249	15,301
Immigrants(B)										
S11	1,033	1,244	1,429	1,538	1,655	1,725	1,861	1,906	1,917	1,855
S12	1,033	1,617	2,110	2,535	2,948	3,143	3,408	3,615	3,688	3,649
S13	1,033	1,996	2,807	3,564	4,297	4,633	5,044	5,433	5,577	5,568
B/A×100										
S11	2.8	3.4	4.3	5.3	6.6	8.2	10.4	12.1	14.1	16.0
S12	2.8	4.4	6.2	8.5	11.3	14.0	17.5	20.7	24.0	27.3
S13	2.8	5.3	8.1	11.6	15.6	19.3	23.8	28.2	32.3	36.4

[Figure 10] Prospects for the Working Age Population (15-64) and Proportion of Immigrants



Effect on the Elderly Population

As fertility has a long-term effect on the elderly population, the size of the elderly population under the medium and high variants for fertility is consistent until 2050. In other words, the native elderly population is likely to rise from 5,360,000 in 2010 to 12,070,000 in 2030 and triple to 16,950,000 in 2050.

〈Table 8〉 Prospects for the Total Elderly Population (Aged 65 or More)

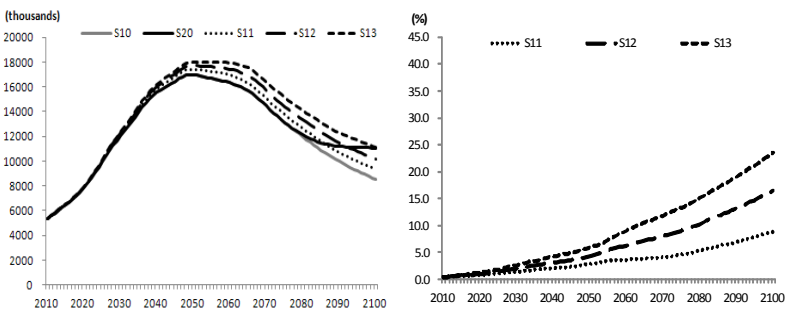
(Unit: thousands, %)

	2010	2020	2030	2040	2050	2060	2070	2080	2090	2100
Total (A)										
S10	5,364	7,897	12,071	15,547	16,948	16,325	14,430	11,976	9,961	8,508
S20	5,364	7,897	12,071	15,547	16,948	16,325	14,430	12,113	11,195	11,032
S11	5,386	7,959	12,242	15,870	17,428	16,939	15,038	12,638	10,691	9,338
S12	5,386	7,975	12,319	16,047	17,708	17,429	15,685	13,345	11,469	10,188
S13	5,386	7,992	12,397	16,227	17,992	17,937	16,363	14,090	12,299	11,105
Immigrants(B)										
S11	23	62	171	323	480	614	608	662	729	830
S12	23	79	248	500	760	1,105	1,255	1,369	1,507	1,680
S13	23	95	326	680	1,044	1,612	1,933	2,114	2,338	2,596
B/A×100										
S11	0.4	0.8	1.4	2.0	2.8	3.6	4.0	5.2	6.8	8.9
S12	0.4	1.0	2.0	3.1	4.3	6.3	8.0	10.3	13.1	16.5
S13	0.4	1.2	2.6	4.2	5.8	9.0	11.8	15.0	19.0	23.4

The total elderly population including both natives and immigrants under the low, medium and high variants for international migration is expected to increase from 5,390,000 in 2010 to 12,240,000-12,400,000 in 2030 and 17,430,000-17,990,000 in 2050. During the same period, the immigrant elderly population is likely to rise from 20,000 in 2010 to 170,000-330,000 in 2030 and 480,000-1,040,000 in 2050.

The share of the immigrant elderly population in the total elderly population is forecast to increase from 0.4% in 2010 to 2.8-5.8% (2.8% for low variant 2.8%, 4.3% for medium variant, 5.8% for high variant) in 2050. It seems to be due to the aging of international marriage immigrants.

[Figure 11] Prospects for the Elderly Population (Aged 65 or More) and Proportion of Immigrants



2. Effect of Immigration on Population Structure

Effect on the Age Structure

It is expected that the population structure will undergo many changes in the future due to low fertility, population aging and international migration. If the current low fertility level continues without immigration (S10), the share of the youth population in the total population is likely to decline to 8.7% in 2050 from 16.3% in 2010. The share of the youth population under the

assumptions for international migration (S11-S13) is forecast to be 9.2-9.8%, which will be higher than the scenario with constant fertility but without international migration (S10) by 0.5-1.1%p. It implies that the immigration makes a contribution to an increase in the youth population even though it may be negligible. However, if the fertility rate of natives climbs to the population replacement level by 2040, the portion of the youth population in the total population is, even without immigration, expected to rise to 13.6% in 2050, showing that rising fertility is more influential than the immigration.

If the current fertility level is sustained without international migration (S10), the share of the working age population in the total population is expected to fall to 52.8% in 2050 from 72.7% in 2010. Even if the fertility rate rises to the population replacement level by 2040 (S20), the share is forecast to decline to 52.4%. The portion of the working age population in the total population under the assumptions for international migration and the medium variant for fertility is likely to fall to 53.4-54.6% as of 2050. The share of the working age population in the total population is relatively higher in the scenarios of international migration than those of fertility. It is because most of immigrants are young people for the purpose of labor. However, the differences between the scenarios for international migration and fertility are minimal, and if fertility rises in the long-term, the fertility scenario is likely to result in the higher share of the working age population than international migration assumptions.

The ratio of the elderly population to the total population as of 2010 is around 11%. If the current low fertility level is maintained without immigrants (S10), the share of the elderly population in the total population is expected to increase to 20% in 2025, 38.5% in 2050, and 42.6% in 2100. According to international migration assumptions, the share is expected to hit 20.5% for low variant, 20.3% for medium variant and 20.0% for high variant in 2026 and 37.4% for low variant, 36.5% for medium variant and 35.7% for high variant in 2050. Then, it will climb to 41.3% for low variant, 40.2% for medium variant and 39.2% for high variant in 2070 and 40.4% for low variant, 38.9% for medium variant and 37.7% for high varian in 2100. In other words, international migration assumptions are not likely to significantly reduce the aging level compared to the scenario S10 with the assumption that the current fertility level is sustained without immigrants. It is because most of the immigrants return to their home countries after a given period of time and immigrants who settle down in Korea also age although the immigrants consisting of young people may slow down the pace of aging. Instead, it is likely that the rising native fertility rate up to the replacement level by 2040 even without immigrants (S20) will be more effective in mitigating population aging. According to this scenario, the percentage of the elderly population in 2026 is 20.4%, which is similar to other scenarios. But, the share is forecast to substantively fall to 34.0% in 2050, and 27.4% in 2100. In comparison to three international migration assumptions, the share of the elderly population will be lower by 1.7-3.4%p in 2050 and 10.3-13.0%p in 2100.

〈Table 9〉 Prospects for the Changes in the Population Structure

(Unit: %)

	Youth Population					Working Age Population					Elderly Population				
	S1	S2	S3	S01	S02	S1	S2	S3	S01	S02	S1	S2	S3	S01	S02
2010	16.2	16.2	16.2	16.3	16.3	73.0	73.0	73.0	72.7	72.7	10.8	10.8	10.8	11.1	11.1
2020	13.0	13.1	13.1	12.8	13.9	71.5	71.5	71.6	71.3	70.4	15.5	15.4	15.3	15.9	15.7
2030	11.8	12.0	12.2	11.5	14.9	64.4	64.5	64.6	64.1	61.7	23.8	23.5	23.2	24.4	23.4
2040	10.5	10.7	10.9	10.0	14.1	57.7	58.0	58.4	57.3	55.7	31.8	31.3	30.7	32.7	30.2
2050	9.2	9.5	9.8	8.7	13.6	53.4	54.0	54.6	52.8	52.4	37.4	36.5	35.7	38.5	34.0
2060	9.2	9.6	9.9	8.7	15.3	50.3	50.9	51.5	49.5	50.4	40.5	39.5	38.6	41.8	34.3
2070	9.3	9.7	10.1	8.7	15.9	49.4	50.1	50.7	48.2	51.8	41.3	40.2	39.2	43.2	32.3
2080	9.0	9.5	9.9	8.4	15.8	50.5	51.3	52.1	49.2	55.6	40.5	39.2	38.1	42.5	28.7
2090	9.2	9.7	10.1	8.6	16.9	50.8	51.7	52.5	49.3	55.8	40.0	38.6	37.4	42.1	27.3
2100	9.5	10.0	10.3	8.7	17.1	50.1	51.1	52.0	48.7	55.6	40.4	38.9	37.7	42.6	27.4

Effect on the Dependency Ratio

The youth dependency ratio, which refers to the proportion of the youth population per 100 persons of working age, is expected to continually fall due to low fertility. If the low fertility rate of natives continues without immigrants, the youth dependency ratio is likely to fall from 22.4 in 2010 to 17.9 in 2030 and 16.5 in 2050 due to a sharp decline in the youth population. The youth dependency ratio will rise according to the international migration assumptions (S11-S13), but it would not be so significant. Meanwhile, if the fertility rate of natives increases to the replacement level by 2040 without immigrants, the youth dependency ratio is expected to rise in an irregular manner.

The elderly population is likely to surge as baby boomers enter the elderly population, which will result in a sharp rise in the elderly dependency ratio. The scenario S10 where the fertility rate of natives is low without immigrants will post the fastest increase in the elderly dependency ratio, marking more than 90 in 2060. In the case of the immigration (S11-S13), the

working age population is expected to grow so that the elderly dependency ratio is likely to fall relatively. However, if the fertility rate rises without immigrants (S20), the elderly dependency ratio is forecast to decline further than the immigration.

〈Table 10〉 Prospects for the Dependency Ratio

	Youth Dependency Ratio					Elderly Dependency Ratio					Total Dependency Ratio				
	S1	S2	S3	S01	S02	S1	S2	S3	S01	S02	S1	S2	S3	S01	S02
2010	22.1	22.1	22.1	22.4	22.4	14.8	14.8	14.8	15.2	15.2	37.0	37.0	37.0	37.6	37.6
2020	18.2	18.3	18.3	17.9	19.8	21.7	21.5	21.4	22.3	22.3	39.9	39.8	39.7	40.2	42.0
2030	18.3	18.6	18.8	17.9	24.2	36.9	36.4	35.9	38.0	37.9	55.2	55.0	54.7	56.0	62.0
2040	18.1	18.4	18.7	17.5	25.3	55.1	53.8	52.6	57.0	54.4	73.2	72.3	71.3	74.5	79.7
2050	17.3	17.6	17.9	16.5	26.0	70.0	67.6	65.3	72.9	64.8	87.3	85.2	83.3	89.4	90.8
2060	18.3	18.9	19.3	17.6	30.3	80.5	77.6	74.9	84.5	68.1	98.8	96.5	94.2	102.1	98.3
2070	18.8	19.4	19.8	18.0	30.6	83.7	80.4	77.3	89.6	62.3	102.4	99.7	97.2	107.5	92.9
2080	17.9	18.5	18.9	17.0	28.4	80.2	76.4	73.1	86.4	51.6	98.1	94.9	92.0	103.4	79.9
2090	18.2	18.8	19.2	17.4	30.2	78.7	74.7	71.3	85.3	49.0	96.9	93.5	90.5	102.8	79.2
2100	18.9	19.5	19.8	17.9	30.7	80.6	76.1	72.6	87.4	49.3	99.5	95.6	92.4	105.4	80.0

Chapter

05

Conclusion

Chapter 5

Conclusion

This study stems from the view that low fertility and population aging can be resolved by the immigration. Many studies predict that economic growth will slow down due to the shortfall of labor force and the growing burden of social security as the protracted low fertility of the Korean society will accelerate population aging. Thus, this study analyzed the effect of immigration on the size and structure of population. Key results are as follows.

The immigration gears down depopulation, and when the immigration enlarges, it can increase the total population. It can even rein in the contraction of the working age population as it serves as a source of labor force. However, if the fertility rate rises to the replacement level by 2040, similar effects are expected on the total population and the working age population as the case where the current immigration level is sustained, and even bigger impacts can be generated than the massive immigration in the long-term.

The population aging level would not be reduced depending on the degree of immigration. It is because immigrants who settle down in Korea will age as well over time. If the fertility rate of natives rises to the replacement level, population aging will be greatly mitigated. In sum, the increase in immigration expands the size of the working age population in the short-term

so that depopulation can be delayed and mitigated to some extent. However, immigrants are also bound to age in the mid- to long-term. Thus, it can be concluded that the fundamental population issues cannot be tackled without fertility recovery.

In the mean time, the immigration is expected to have a positive effect on economic growth in the long-term. However, if the productivity of foreigners is extremely low, the contribution will be small, and they may increase the burden of social insurance. In addition, an increase in immigration may provoke conflicts between natives and immigrants regarding limited resources such as jobs, wages, welfare and housing. In short, although Korea has not yet experienced conflicts as the share of immigrants in the total population is smaller than advanced countries with long immigration history, it is highly likely that such conflicts may take place with the growing immigration. Thus, it should be noted that huge social costs can be incurred in Korea as well.

The following policy proposal can be presented based on the analysis results.

Firstly, immigration policies must planned and executed in accordance with the trend of low fertility and population aging. It is also necessary to deliver a comprehensive package linked with measures for recovering the fertility rate and expanding the use of female and elderly labor force. The analysis results show that the positive effects of immigration would not be so significant and that some positive effects can even be offset if social conflicts increase due to the immigration. Given such social costs, raising the fertility rate will be more cost effective than encouraging the immigration and serve as a more fundamental

solution. Thus, it is essential to analyze the pros and cons of immigration in an incremental manner and in accordance with the trend of low fertility and population aging, and immigration polices must be established in harmony with other policies based on analysis results.

Secondly, with growing immigrants, their qualifications have an increasing impact on the overall quality of the total population and directly and indirectly affect social integration. Thus, it is necessary to provide childcare and education to the children of immigrants in a systematic manner. Their commonalities and distinctiveness must be considered at the same time when planning childcare and education programs for their children. In other words, policies to adjust the immigration in number must be combined with social integration policies to minimize social conflicts if the immigration is needed.

Lastly, Korea does not need to mirror other countries' history of immigration policies since their national, social and cultural background would greatly differ from Korea. For example, the policy mechanism adopted by the United States and Australia with a large share of immigrants would not be suitable to Korea to introduce as it is. In particular, as Korea places great emphasis on homogeneity, national and social issues stemming from the increasing immigration would be more intricate and extensive. Thus, immigration polices must be regarded as an independent policy realm which takes into account the inherent socioeconomic attributes of immigrants. In other words, immigrants must be considered at the national strategy level based on accurate future prospects and analysis results. To this end, it is critical to

systematically plan and perform a mid to long-term master plan based on objective and precise analysis results on the future trends and prospects for the immigration, internal and external causes and effects.

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